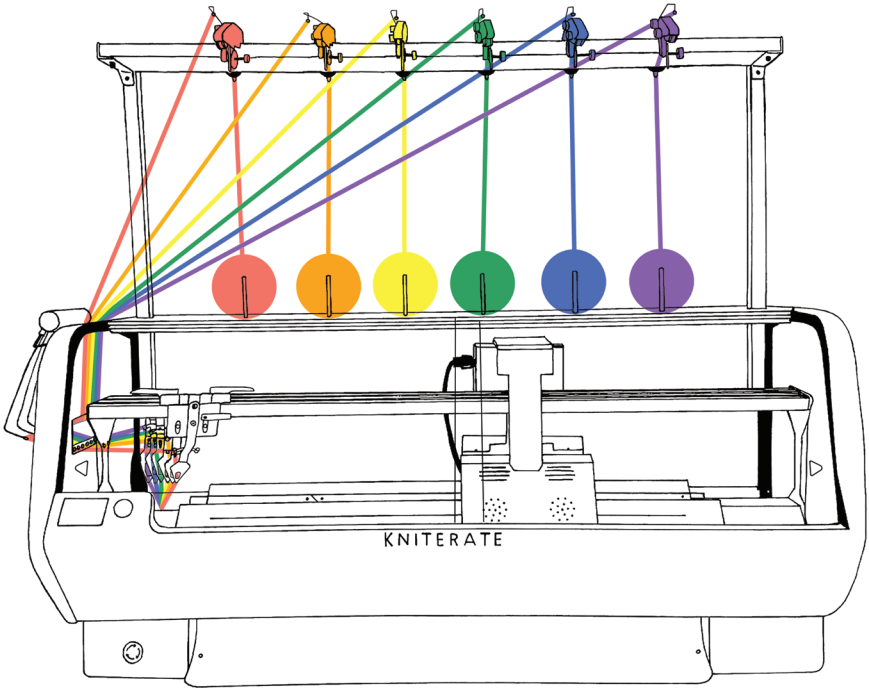



# KNITERATE

The digital knitting machine for your workshop

CE

Thank you for purchasing a Kniterate digital knitting machine!

Before using the machine, carefully read the safety instructions and study this manual for the correct operation of the various functions. Keep this manual where it can quickly be accessed for future reference. All information in this manual may be subject to change; images are provided for reference and may be slightly different from your product.

Please always make sure that you use the most updated instructions for your machine. Visit www.kniterate.com to find the latest version.

We hope you will enjoy knitting your designs and we're looking forward to seeing your creations!

**PLEASE KEEP THESE INSTRUCTIONS FOR REFERENCE**

**Specifications**

| | |
|---|---|
| Gauge | 7 needles per inch / 3.6 mm distance between needles |
| Number of needles | 252 per needle bed (504 in total) |
| Knitting width | Variable stroke. Max 914.4mm / 36 inches |
| Knitting speed | 800mm/sec. Adjustable speed levels |
| Stitch density | 16 levels, electronically controlled on each row |
| Racking | Motor-driven. Max 4-pitch racking to each side |
| Knitting system | Single system with transfer cams on both sides |
| Needle selection | Needles individually controlled. Knit, tuck, transfer and split functions. Tuck function is limited: the machine can't combine tuck and knit operations within the same pass on the same bed |
| Transfer | Back to front during right to left traverse, front to back during left to right traverse |
| High takedown roller | Electronically adjustable rotation in both directions on each row |
| Tension devices | 8 top and 6 side tensioners with adjustable feeding tension |
| Stop motion | Open door, broken yarn, knot or lump detection, shock and roller error |
| Drive system | Belt drive, no lubrication necessary |
| Safety devices | Full safety cover + interlock for noise-suppression and dust-proofing.<br>Emergency power-off device. Ultra-low speed setting |
| Operation LED light | White, adjustable brightness |

| | |
|---|---|
| **Controller** | |
| **Data input** | SD card |
| **Control system** | Stored program for flat knitting machine |
| **Control display** | Multicolor LCD panel. Menu in English |
| **Other** | |
| **Size** | 152 x 70 x 65 cm / 60" x 28" x 26" |
| **Weight** | 210 kg / 463 lbs |
| **Power** | Domestic socket 110-240V 10A |
| | Max consumption 1000W |
| **Shipping size** | 180 x 100 x 90 cm / 71" x 39" x 35" |
| **Shipping weight** | 305 kg / 672 lbs |

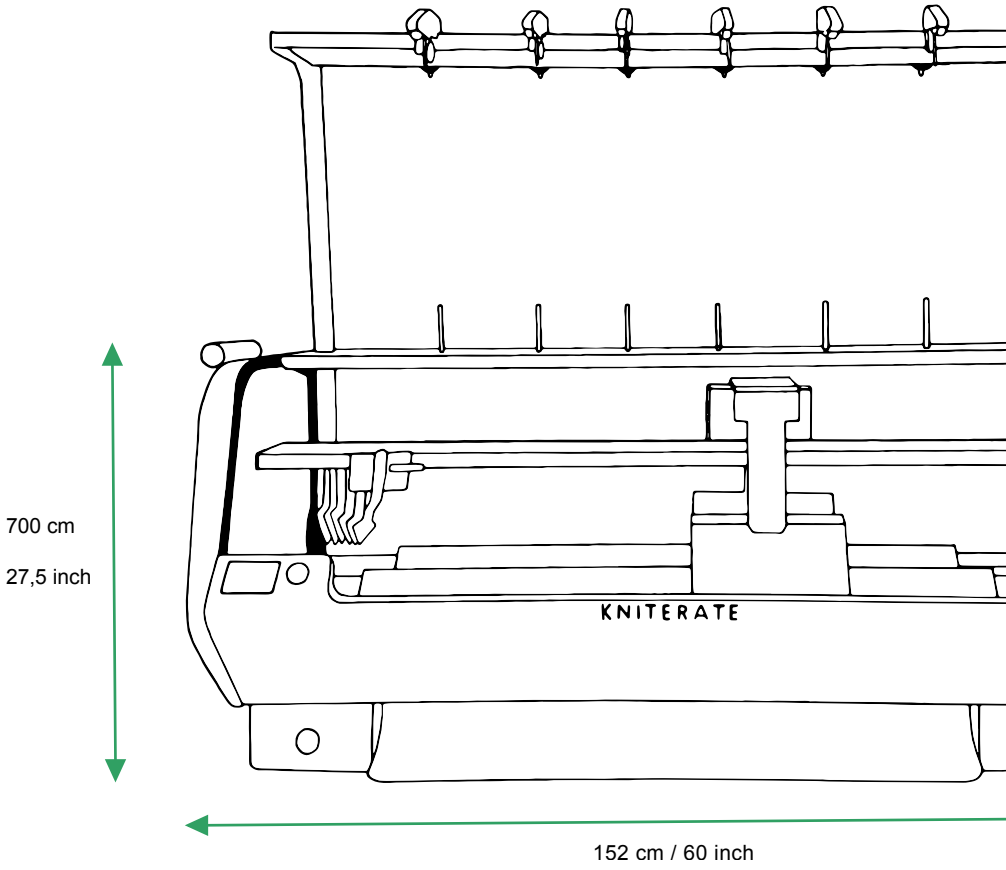
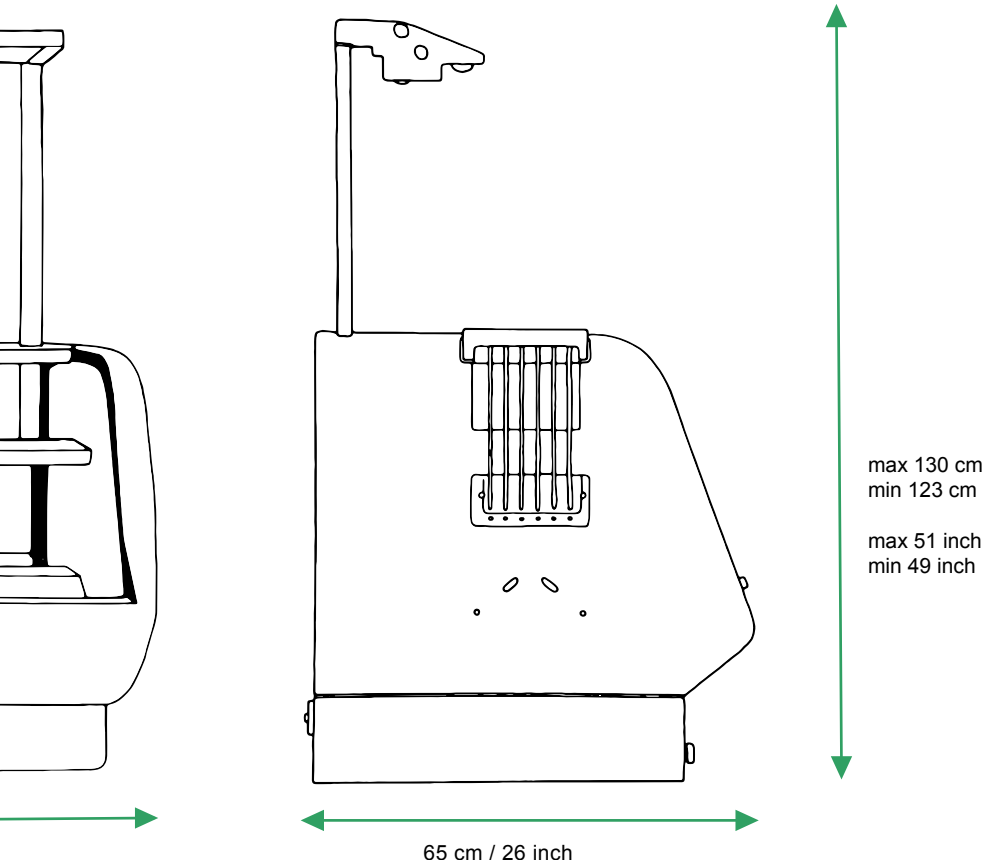



Fig 1


max 130 cm
min 123 cm
max 51 inch
min 49 inch
65 cm / 26 inch

# 4 TABLE OF CONTENTS

7 - YARNS & CONES



8 - KNITTING

## 9 - FINISHING A PRODUCT



## 10 - MAINTENANCE



## 11 TROUBLESHOOTING

# 5 SETTING UP

WARNING:

FOLLOW THESE INSTRUCTIONS CAREFULLY. FAILING TO FOLLOW THESE INSTRUCTIONS COULD GENERATE SERIOUS DAMAGE TO THE MACHINE AND THE OPERATORS INVOLVED IN ITS TRANSPORTATION.

IN CASE OF DOUBT CONTACT US

## *5.1 What's inside?*

1x Kniterate digital knitting machine
1x box including:

- 8x yarn cone holders
- 1 x power cable
- 1x SD card (16 GB)
- 1x spare 50 needles
- 2x 300ml knitting machine oil
- 1x allen key size 3
- 2x spare silver thumb screw
- 1x tensioners frame
- 2x spare brush
- 4x spare fuse (2x 2A + 2x 10A)
- 1x needle bar tool
- 6x 10 spare jacks each position
- 1x oil dispenser bottle
- 1x allen key size 5
- 2x wrench (size 20)

## *5.2 Tools and equipment needed to open the crate*

- 1x Wrench size 19
- 1x Hammer

## *5.3 Unpacking your machine*

- Use the back of a claw hammer to remove the top of the crate
- Remove the 4 side panels of the crate
- Remove the box with extra parts
- Take out the tensioners frame
- Remove the plastic cover on the machine
- Take off both side panels to expose the handles (see 5.4)
- Optional: Remove the carriage to lighten the load (see 10.6.1)
- Unscrew the 4 M12 screws underneath the pallet using a size 19 wrench.

### *5.4 Taking off the side panels*

To take off the side panels, unscrew the silver screw at the top of the panel, which you can do by hand.

Once the screw is off, tilt slightly the panel towards you and pull it upwards, to remove it from the two hooks at the bottom of the panel.

For the left panel, on which the side yarn control unit is located, disconnect the sensor before pulling the panel upwards.

### *5.5 Placing the side panels back*

Hold the panel slightly tilted and place its bottom slots into the hooks below the handles of the machine.

Once the panel is inserted in the hooks, hinge it forward to close it.

Mount the panel into the piece where the thumb screw can secure the panel.

Lock the panel by tightening the thumb screw by hand.

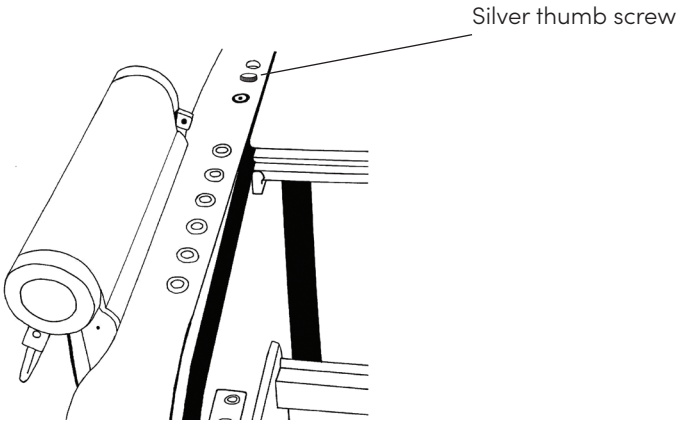



Fig 2

### *5.6 Transportation*

Transportation weight including packaging: 305 kg / 672 pounds.
Transportation weight excluding packaging: 210 kg / 463 pounds.

Kniterate strongly recommends to use a professional service to lift, carry and place the machine, such as piano movers, furniture movers, etc.

Do not try to carry or lift the machine on your own.
Kniterate recommends to carry or lift with a minimum of 4 people.
Kniterate recommends the use of gloves, goggles and and safety boots during transportation.

Rehearse the operation of lifting and carrying the machine to make sure the way is clear and no unexpected events can be presented.
Assess your capabilities before attempting to move the machine.
Failing to do so could generate serious irreversible injury to the movers and damage the machine.

Always lift the machine from both sides simultaneously using the handles.
Never tilt the machine by lifting one side from the surface only.
Putting the weight of the machine on one side only could irreversibly damage internal components of the machine.
The machine can only be tilted when it is lifted from both sides.

Note: The weight of the machine is distributed more in the back than in the front. It is advised that the persons carrying the back use two handles each, while the persons carrying the front use one handle.

Optional: Remove the carriage to decrease the weight of the machine by 25 kg / 55 pounds.

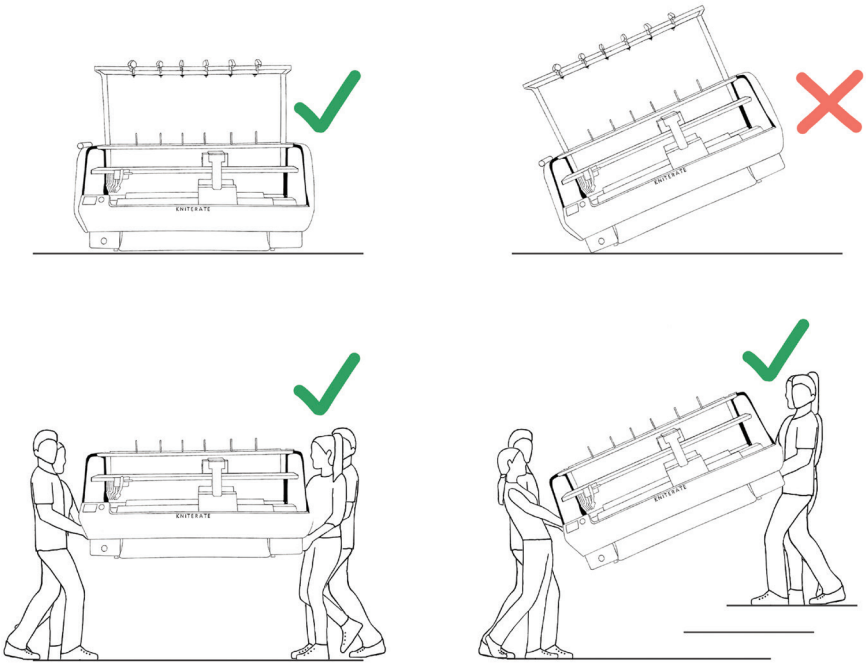


Fig 3

## *5.7 Installation*

Customers are responsible for making sure that the table the machine is placed on, is structurally sound. We recommend placing your Kniterate on an industrial workbench or table that can carry at least 400 kg / 880 lbs and leaves 10 cm / 4 inches around the machine (fig 3). The table should not be able to sway. It is recommended to reinforce the table to reduce sway as much as possible.

If the machine is on a table with a good grip, it won't move around while in operation. It is recommended to use the holes next to the legs to attach the machine to the table when the table has a slippery surface, or if you leave in an earthquake zone for example.

Allow at least 40 cm / 16 inches between the machine and objects or walls on all sides, to facilitate pulling out the carriage. Allow enough space for you or any users to comfortably reach the full needle beds in front and back of the machine.

Place the machine on a even, level suface. If necessary, level the machine using the leveling feet.

Power requirements:
Single phase 110V - 220V 10A
The excess / shortage of line voltage may have an adverse influence upon the performance of the machine.

### *5.8 Environmental conditions*

Please install the machine as below instructions, in order to use and keep this machine in good working condition.

1. Do not install the machine at a place subject to direct sunshine and/or adjacent to a heat generation source such as a furnace/oven.
2. Do not install the machine at a place subject to rapid temperature changes. The temperature should be 10°C ~ 35°C / 50°F ~ 95°F.
3. Do not install the machine at a place where there is a lot of dust and dirt, or a location affected by chemical gases, sea breeze, etc.
4. Do not install the machine at a place subject to excessive moisture. The humidity should be 30 ~ 80%.
5. Do not install the machine on a slope or an unstable surface.
6. Please make sure the outlet where the machine is connected to is grounded.

Kniterate does not accept any responsibility when these requirements are not met.

### *5.9 Safety talk*

#### *5.9.1 IMPORTANT SAFETY INSTRUCTIONS*

Please read these safety instructions before attempting to use the machine. To reduce the risk of burns, fire, electric shock, or injury to persons:

*1*

- Never operate this machine if the cord or plug is damaged, if it is not working properly, if it has been dropped or damaged, or water is spilled on the unit.
- Do not use Kniterate or its components in any manner or for any other purpose other than as specifically instructed in this user instructions manual.
- Do not modify Kniterate or its components.
- Do not use outdoors.

*2* This machine is not a toy:

• Kniterate can cause serious injury and should be accessible only to those that have read this user instructions manual and are capable of understanding the risks associated with this tool.

• Ensure the Kniterate location will never result in an untrained individual using the machine.

• Your close attention is necessary when the machine is used near children. Never leave children, (pet) animals or uninducted individuals unsupervised in the same space as your machine.

• If Kniterate is intended to be used by multiple people, put an orientation and training program in place at the facility to ensure correct usage.

• Do not setup, operate, or perform maintenance on the machine under the influence of illicit drugs, alcohol, or over-the-counter and prescription drugs that can impair one's ability to operate heavy machinery safely.

*3* Always keep your work area clear:

• Never operate the machine when the ventilation is blocked. Keep ventilation openings of the machine free from the build up of lint, dust, and loose cloth.

• Never drop or insert any object or liquids into any opening.

*4* Special care is required when knitting:

• Always pay close attention to the needles. Do not use bent or damaged needles.

• Keep fingers away from all moving parts. Special care is required around the needles and rollers area.

• Turn the machine off when manually operating in the needles area.

• Don't wear dangling jewelry, rings or loose clothes, don't use headphones.

• Wear closed shoes and tie back long hair when operating the machine.

*5* For a longer service life:

• Use only neutral soaps or detergents to clean the case. Benzene, thinner, and scouring powders can damage the case and machine, and should never be used.

• Always consult the operation manual when replacing or installing any assemblies, yarn carriers, needles, or other parts to assure correct installation.

*6* For repair or adjustment:
• In the event a malfunction occurs or adjustment is required, first follow the troubleshooting table in the back of the user instructions manual to inspect and adjust the machine yourself. If the problem persists, please contact Kniterate.

Use this machine only for its intended use as described in the manual. Use accessories recommended by the manufacturer.

The contents of this manual and specifications of this product are subject to change without notice. For additional product information and updates, visit www.kniterate.com

SAVE THESE INSTRUCTIONS

### *5.9.2 Kniterate safety instructions*

Don't use the machine if you identify any damaged part that could compromise the performance of the machine and/or the safety of the user. In such case, please keep the machine disconnected from power and contact Kniterate to receive instructions on how to safely proceed.

Always use safety goggles near the lateral yarn control unit (see p23). The loaded spring can impact your eyes if released when manipulating the spring or when a yarn is broken.

Keep your fingers away from the rollers all the times when the machine is on. The rollers are really strong and can't be manually turned or stopped.

Keep the machine attended at all times when running.

Extra care and caution required when handling needles, jacks or other parts that can be sharp.


# 6 GETTING STARTED

## *6.1 Parts overview*

### *6.1.1 The machine*

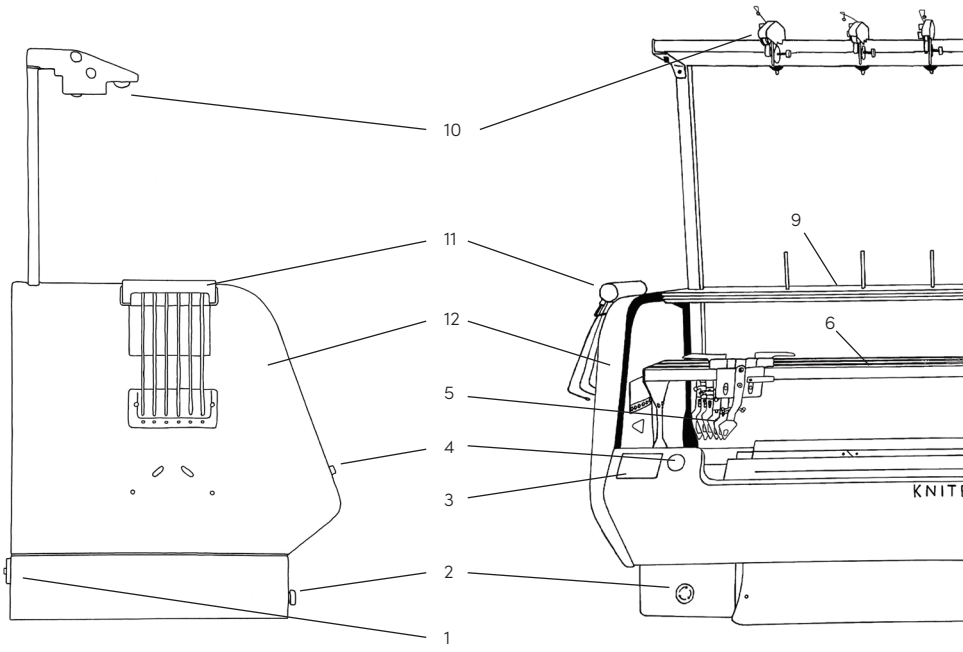
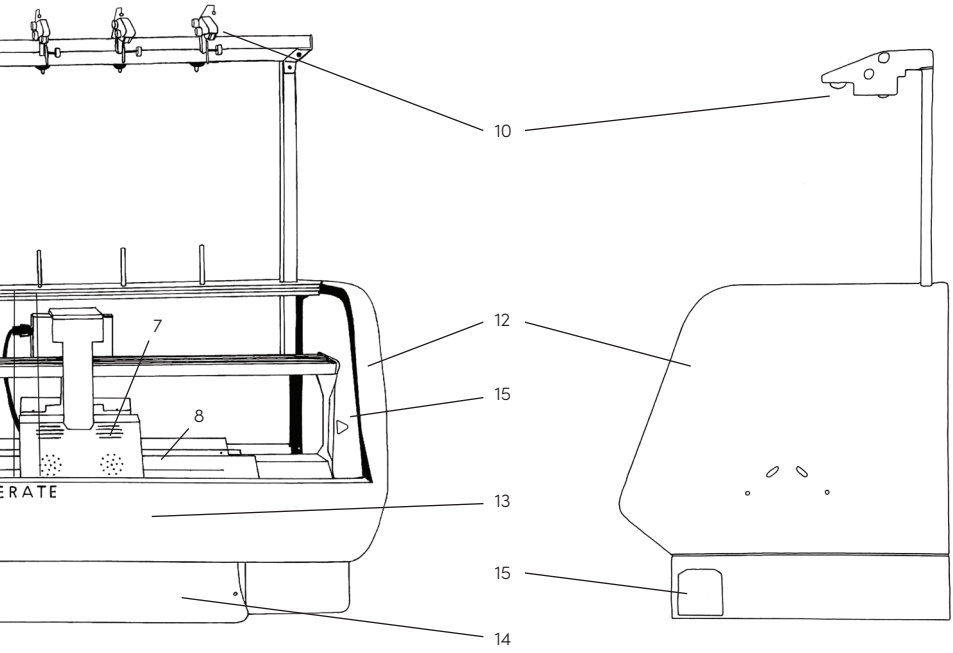



Fig 4

| | | | |
|---|---|---|---|
| 1 | On/Off switch | 5 | Yarn feeders |
| 2 | Emergency stop button | 6 | Carrier rails |
| 3 | LCD display menu | 7 | Carriage |
| 4 | Menu dial | 8 | Needle bed |




| | | | |
|---|---|---|---|
| 9 | Bobbin board | 13 | Fabric takedown (inside) |
| 10 | Top yarn control unit | 14 | Fabric collection slot |
| 11 | Lateral yarn control unit | 15 | Cover doors |
| 12 | Side panels | 16 | Excess oil reservoir |

### *6.1.2 Top yarn control unit*

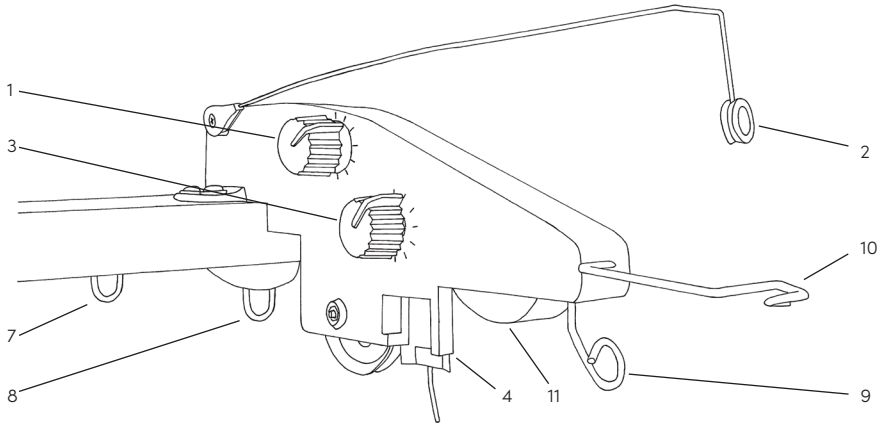



Fig 5

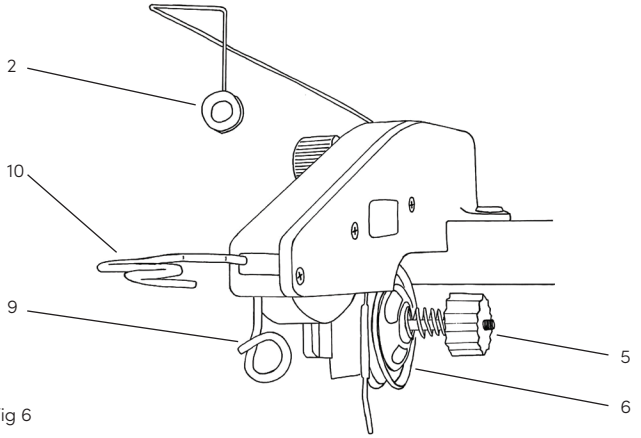



Fig 6

| | | | |
|---|---|---|---|
| 1 | Tension adjusting wheel | 7 | Guide I |
| 2 | Tension arm | 8 | Guide II |
| 3 | Knot sensor adjusting wheel | 9 | Guide III |
| 4 | Knot sensor | 10 | Guide IV |
| 5 | Brake discs adjusting wheel | 11 | Sensor error light |
| 6 | Brake discs | | |

### *6.1.3 Lateral yarn control unit*

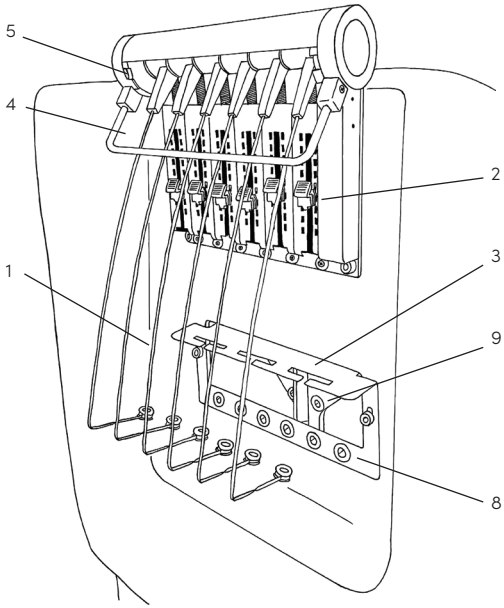



Fig 7

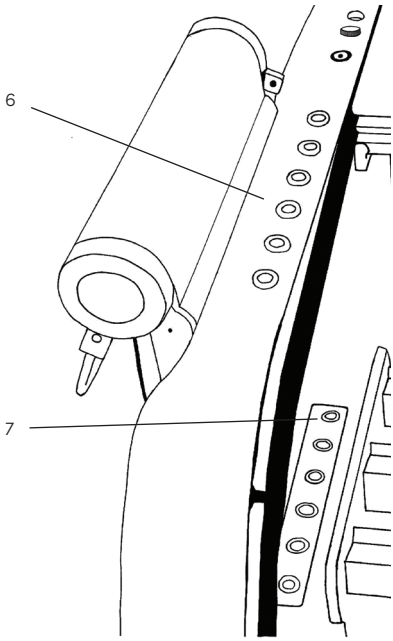



Fig 8

| | |
|---|---|
| 1 | Tension arm |
| 2 | Tension adjusting slide |
| 3 | Tension arm parking space |
| 4 | Sensor bar |
| 5 | Sensor error light |
| 6 | Guide V |
| 7 | Guide VI |
| 8 | Guide VII |
| 9 | Extra guide for yarn carriers 3 and 4 |

### 6.1.4 *Feeders*

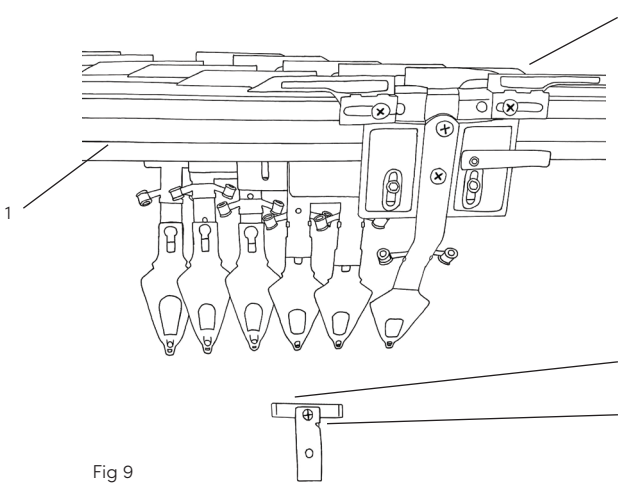



Fig 9

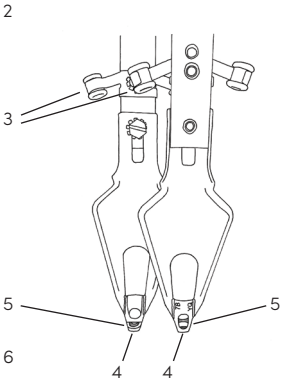



Fig 10

| | | | |
|---|---|---|---|
| 1 | Carrier rail | 5 | Plating slit |
| 2 | Carrier bow | 6 | Yarn clamp |
| 3 | Guide VIII | 7 | Knife |
| 4 | Knitting hole | | |

### 6.1.5 *Cross section needle bed*

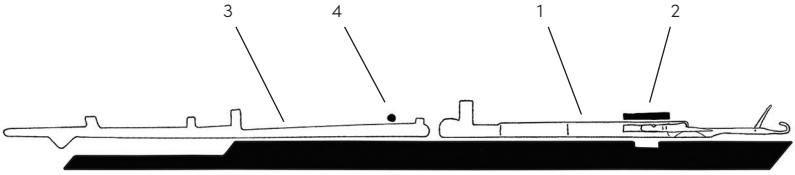



Fig 11

| | |
|---|---|
| 1 | Needle |
| 2 | Needle bar |
| 3 | Jack |
| 4 | Cover rail |

### *6.1.6 Needles*

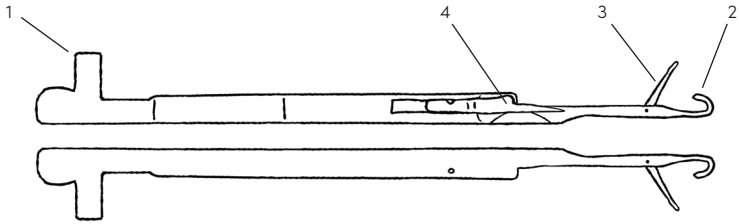



Fig 12

| | |
|---|---|
| 1 | Butt |
| 2 | Hook |
| 3 | Latch |
| 4 | Transfer spring |

### *6.1.7 Jacks*

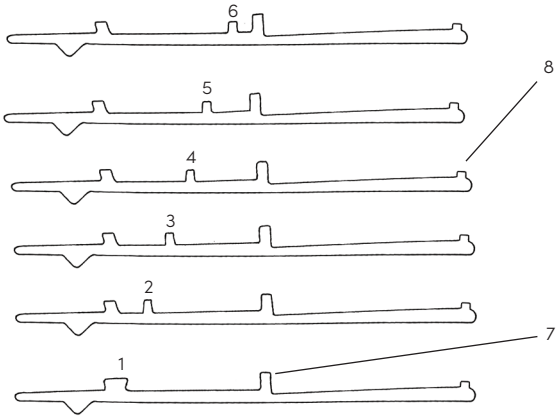



Fig 13

| | |
|---|---|
| 1 - 6 | Counting butt |
| 7 | Butt |
| 8 | Securing butt |

### *6.1.8 Carriage*

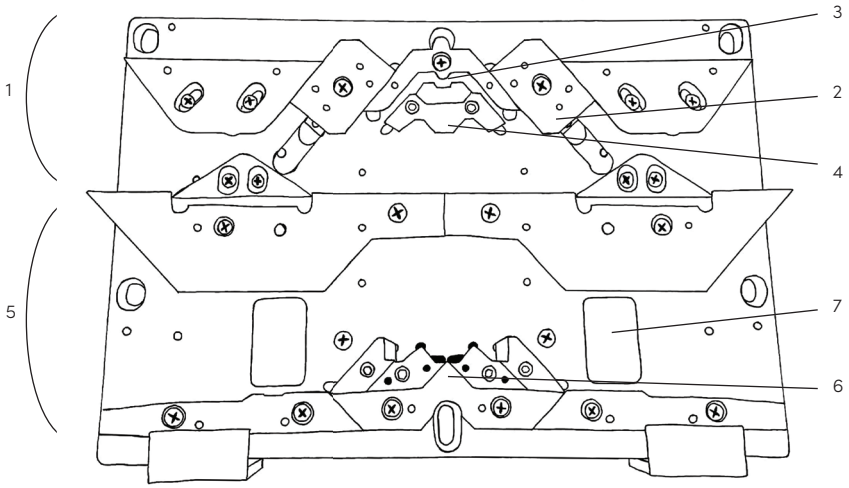



Fig 14

| | | | |
|---|---|---|---|
| 1 | Higher cam set | 5 | Lower cam set |
| 2 | Knitting cam | 6 | Selection cams |
| 3 | Transferring cam | 7 | Selection blades |
| 4 | Stitch size cam | | |

### *6.2 Placing cones*

Kniterate can only knit with yarn from cones. Cakes (as used for a domestic knitting machine) do not work. We recommend using cones that are tapered in shape, as cylindrical cones unwind less smoothly.

Cones should always be placed on the bobbin board, or, if the cones are too big to fit together on the board, directly behind the machine on the table or on the floor.

Place cones always straight underneath the first guide you use, so yarn can unwind upwards easily. Make sure to leave substantial space between cones so yarn can unwind without tangling.

When placing the cone on the coneholder you should feel a bit of friction, but the bottom should still stand on the surface. To adjust the size of the holder, turn the nut clockwise to make it wider or anti-clockwise to make it narrower.

### *6.3 Threading*

There are different pathways for each yarn. In 6.3.1 the first path is explained and in 6.3.2 the other suggested pathways are shown. It is important that yarns never cross or touch each other in their paths.

Do not use any other paths than the designated path for any yarn position.

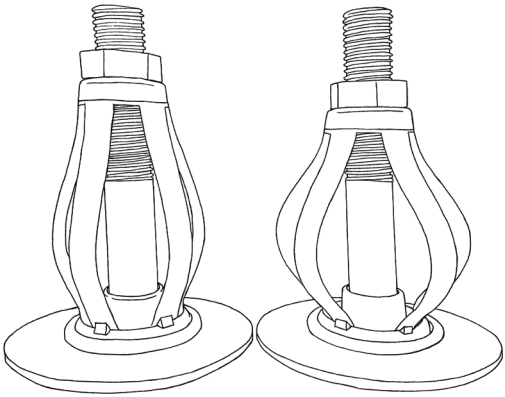


Fig 15

### *6.3.1 Threading the first yarn position using one end of yarn.*

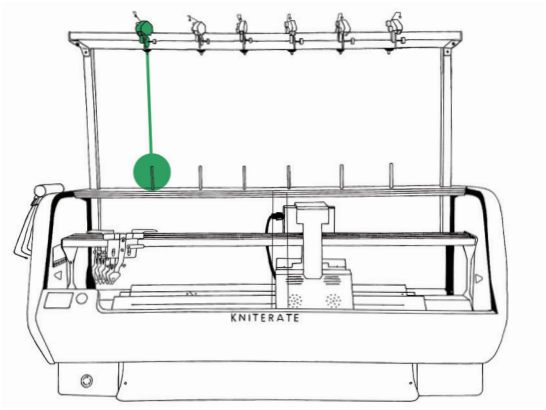



Fig 16

The guides on the top left of the machine, the tension arms of the lateral control unit and the feeders are all named 1 (in front) to 6 (in the back), as are the different yarn paths.

Figure 15
- place the cone and cone holder on the left of the bobbin board, lining up vertically with the first top yarn control unit.

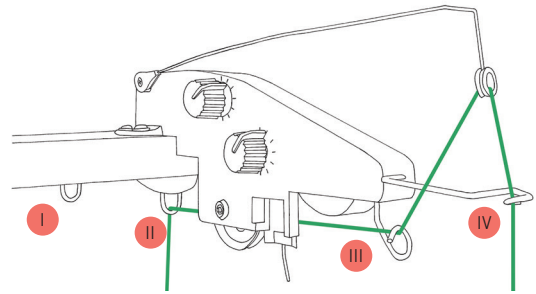



Fig 17

Figure 16+17
- Take the yarn up and through guide II. Guide I is only used additionally for cones on the back row, or behind the machine.

- Push the yarn up between the brake discs until it is caught by the hook in between. The yarn should not be able to fall out anymore.

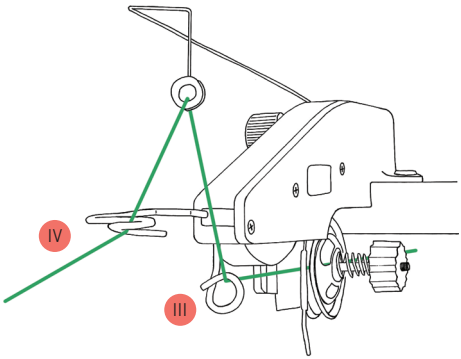



Fig 18

- Guide the yarn in between the metal plate and the latch, then through guide III.

- From there, take it through the eyelet on the tension arm and back down through guide IV.

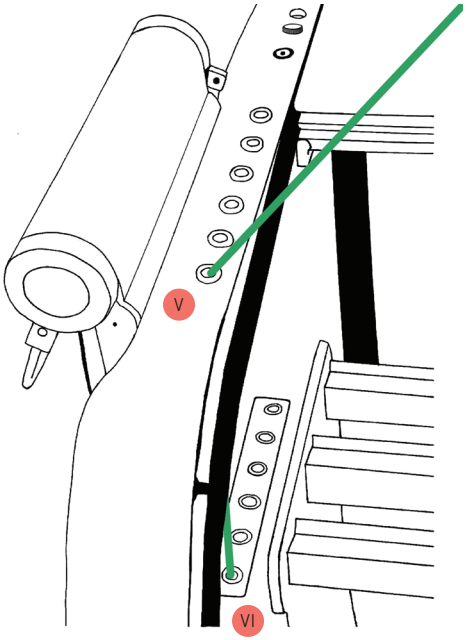



Fig 19

Figure 18
- Go to the top left of the machine, where there is a row of guides V.
- Guide the yarn down through guide V (1) and VI (1) and then out towards the lateral yarn control unit. Do not use guide VII for this; VII is only used to bring yarn back into the machine

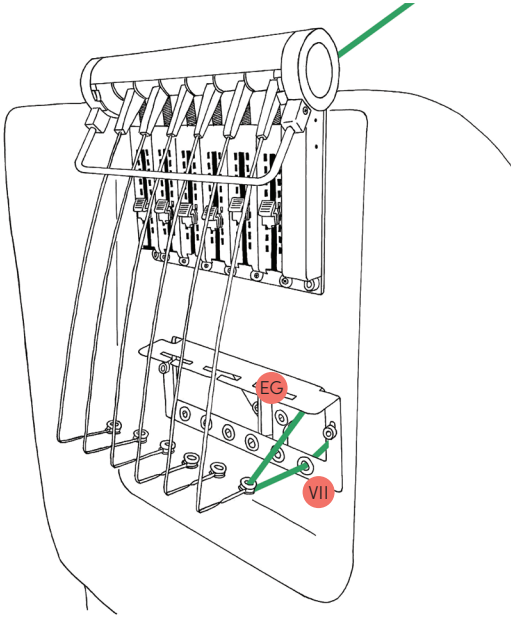



Fig 20

Figure 19
- After running the yarn through tension arm 1, take the yarn into the machine via guide VII.
- Note: use the extra guide (EG) when you're threading the third or fourth yarn position

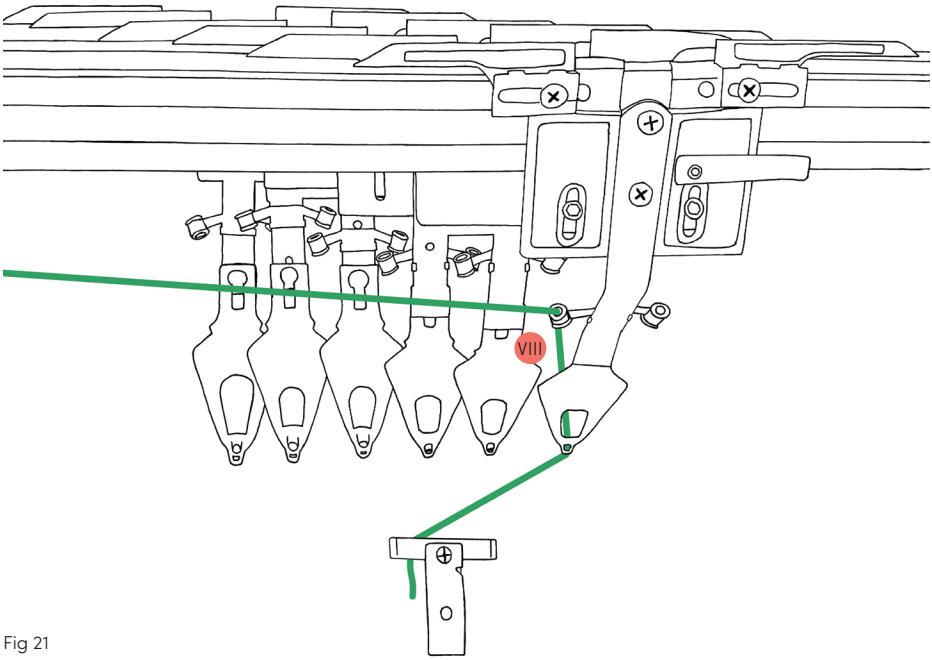



Fig 21

Figure 20+21
- Use the guide VIII (1) that is attached to the left side of feeder 1, and thread the yarn through the knitting gap at the tip of the feeder. Be careful not to use the plating slit (see 6.3.2).
- Clamp the yarn in the left side of the clamp.
- Use the knife to cut the end of the yarn

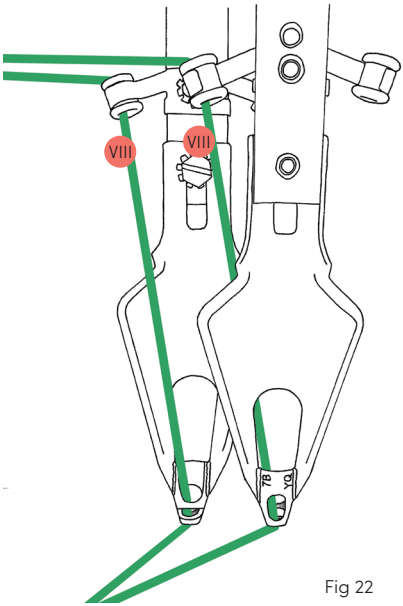



Fig 22

### *6.3.2 Plating*

Plating creates a 2-color pattern in a structure without creating a jacquard.

Plating is knitting with two yarns together in one feeder. Use two yarns of a finer yarn count, that together are between Nm6 and Nm8 (see 7.2 and 7.3).

The second yarn goes through the plating slit, making sure one yarn shows in the front of the knitting while the other shows in the back. The yarns will show through a bit on the other side, creating a mixed colour effect. A plated rib will show vertical columns of both colors, and you can create interesting fabrics when you play around with it a bit.

Thread both yarns in the same pathway, with one yarn threaded through the knitting hole and the other through the plating slit. It is recommended to use one top yarn control for each yarn and bring them together in guide V.

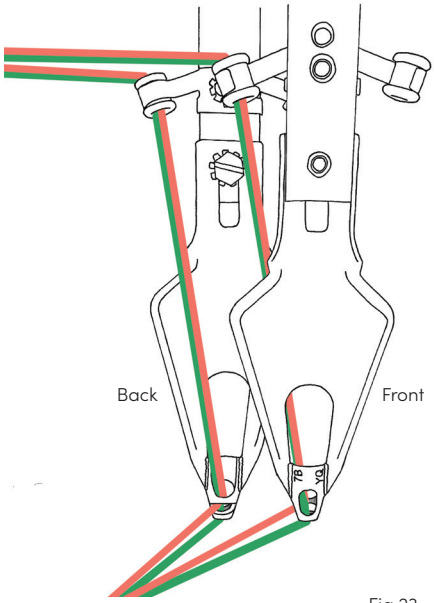



Fig 23

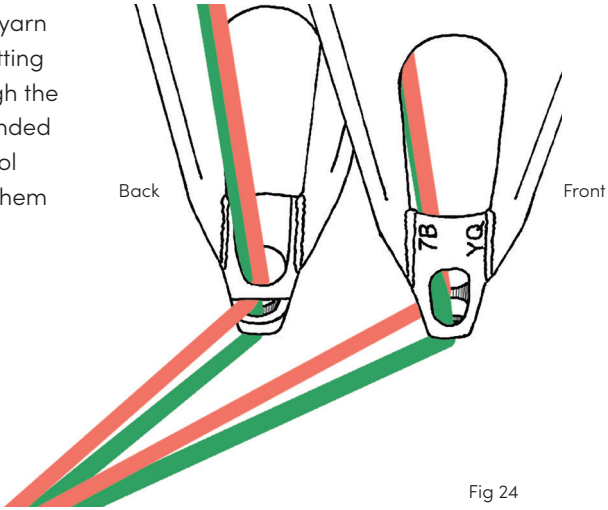



Fig 24

### 6.3.3 *Different pathways*

Each of the six yarn positions has their own path (1 to 6) to prevent the yarn from tangling and breaking.

Thread each yarn as described in 6.3.1, while changing only the location of the path. This means that for example the second yarn follows the orange course (Fig 25 to 28). The third and fourth path use an extra guide (EG) each between guide VII and VIII.

Note: Your machine will have more top yarn control units to allow for more variation in the use of yarns. These illustrations merely show the order in which the machine should be threaded.

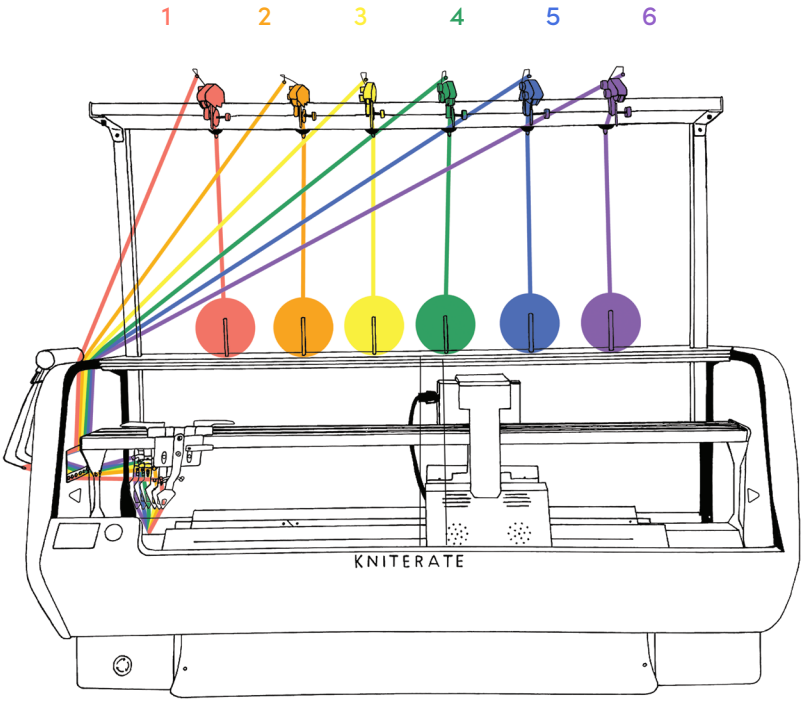



Fig 25

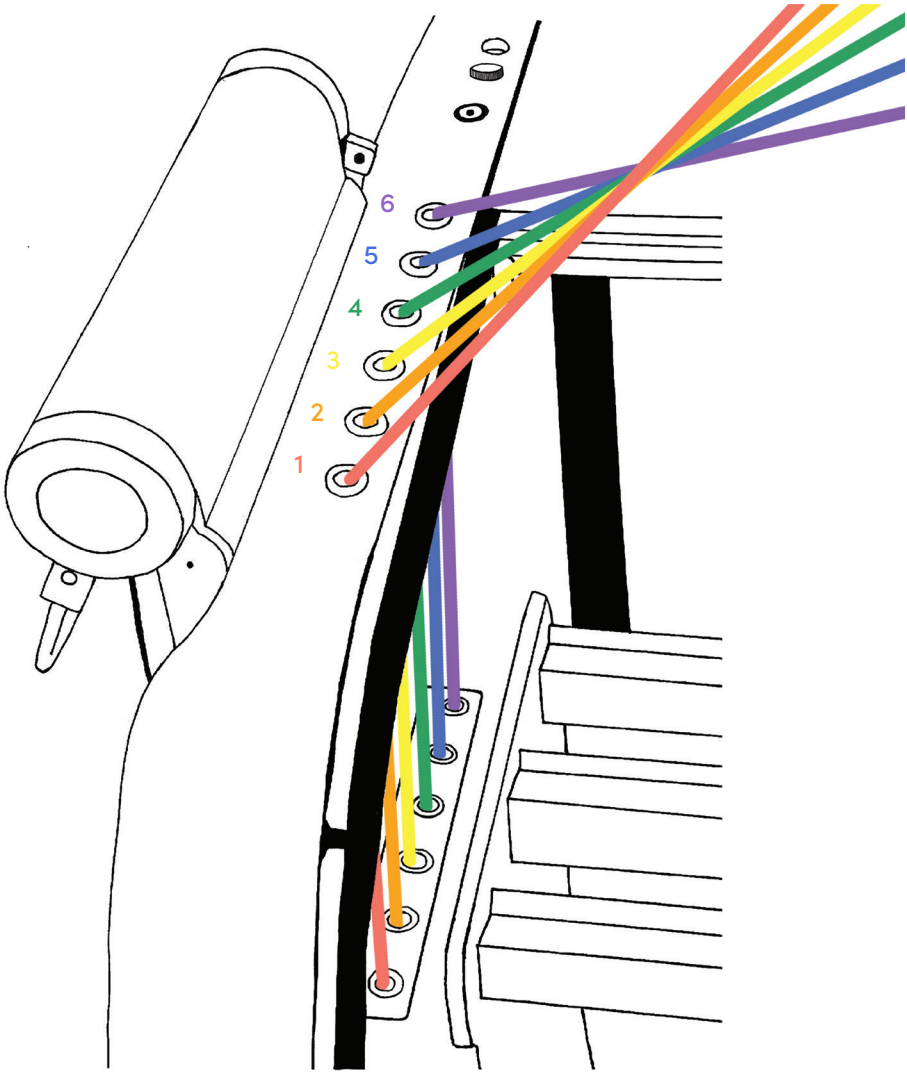



Fig 26

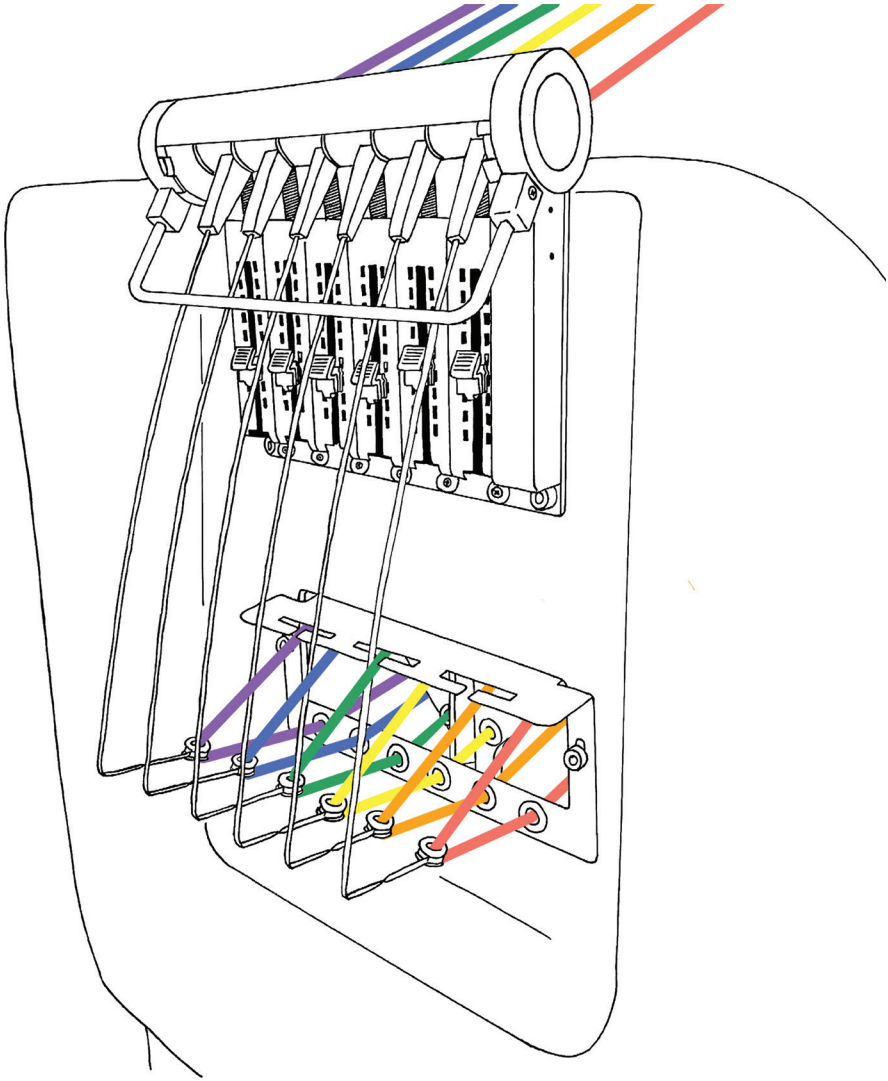


Fig 27

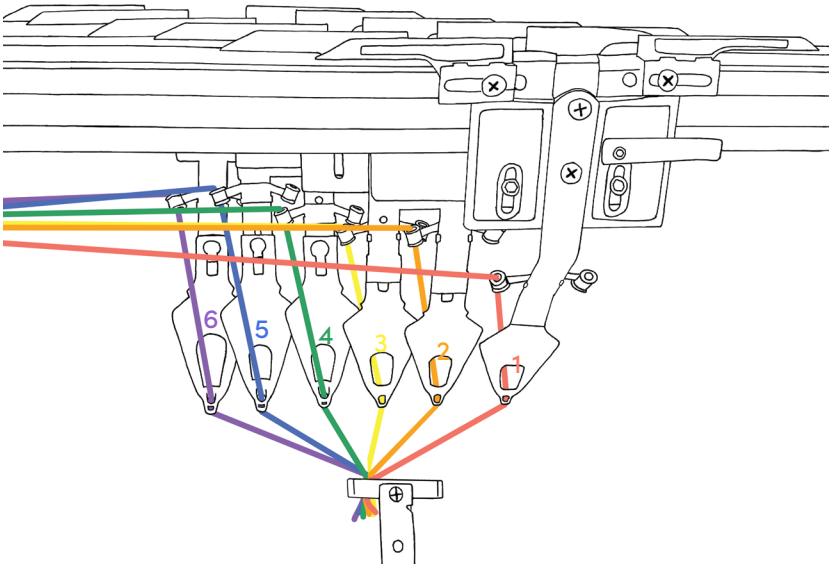



Fig 28

### *6.3.4 Choosing a pathway*

The program that you use to knit, will have assigned certain yarns to certain feeders. When you thread up your machine you should adhere to these, not following the assigned pathways will create a different outcome than you might expect. Of course, if you're feeling adventurous or you want to swap colours without programming it, you can swap pathways.

In figure 29a, the green design is assigned to feeder 3, and the pink background is assigned to feeder 4. To get the right result, thread the green yarn in feeder 3 and the white yarn in feeder 4 (Fig 29c). If you switch them around you will end up with reversed colour (Fig 29b).

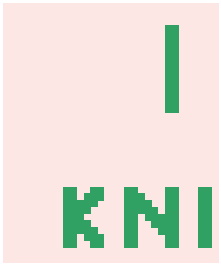


Fig 29a

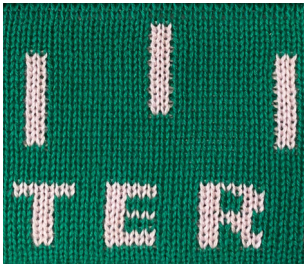


Fig 29b

Fig 29c

### *6.4 Tensioning*

To be able to create an evenly knitted fabric without holes, there should be some constant tension on the yarns. How much tension is required depends on the type of yarn, weight of yarn and type of knit. There are some rules of thumb, which will be explained below, but these guidelines always need some finetuning.

#### *6.4.1 Brake discs*

The brake discs make sure the yarn is unwound at a steady pace. Thin yarn needs higher pressure between the discs, as does slippery yarn. Coarser yarn needs less pressure.

Increase or decrease the pressure by turning the adjusting wheel.

#### *6.4.2 Top tension arm*

Yarn needs to be under a constant tension to be knitted properly. The top tension arm works together with the lateral tension arm. When the tension lowers, the arm pulls up to balance the tension on the yarn.

When the tension in the yarn drops too much, the arm jumps up, the sensor is triggered and the sensor light lights up. It normally refers to a broken yarn, having run out of yarn or incorrect machine settings for the used yarn.

With thinner yarn, the arm needs to pull up less high. To let the arm pull less high, turn the tension adjusting wheel clockwise. For thicker yarn, the pull can be increased by turning the tension adjusting wheel counterclockwise.

#### *6.4.3 Lateral tension arm*

Yarn needs to be under a constant tension to be knitted properly. When the carriage knits from right to left, the knitting yarn would sag, with the risk of being caught in the needles or by the carriage. When the yarn starts sagging, the lateral tension arm moves out and balances the tension on the yarn so it remains in a straight line across the needle bed.

Use the sliders to change the resistance of each lateral tension arm. Move them down to increase, and up to decrease the pull.

### *6.5 Knot sensor*

The knot sensor detects knots as the yarn passes through it. The gap where the yarn runs through should be just slightly wider than the yarn, so that the yarn can pass through without friction, but any knots will trigger the sensor. As such, a thinner yarn needs a smaller gap, and a coarser yarn needs a bigger gap.

To adjust the sensitivity of the sensor turn the knot sensor wheel clockwise (narrower) and anti-clockwise (wider).

### *6.6 Checklist*

Before you start knitting, always check this list to prevent any mistakes:

**Software:**
Selected correct feeders for waste yarn, drawthread and knitting yarn
Speed, stitch length and roller take-down adjusted to yarn and pattern

**Machine:**
All needles are in good condition
All parts are properly lubricated (according to section X from this manual)

All yarns are threaded in the correct paths
All yarn positions match with the programmed feeders
No yarns are crossing
Enough yarn on the cones to knit your program
All yarns are clamped

All used feeders are positioned between the clamp and the needle bed
The feeders that aren't used are placed at either end of the rails
No machine errors; no error lights
SD card with 'command.kc' file inserted

# 7 YARNS AND CONES

Which yarn you use plays a deciding role when you're knitting. This is a short introduction to get you going, but it is advised to do some research and simply try until you find what you need.

## *7.1 Yarn*

There are different categories of yarn, such as animal based - like wool, plant based - like cotton, and oil based synthetics - like polyester. There are also plant based yarns that are chemically processed - like viscose. You can use all sorts of yarn on the machine if it has the right yarn count (see 9.3) but it's always recommended to knit a test piece to fine tune the machine settings. Not every yarn works perfectly with every pattern or stitch and sometimes it needs a bit more testing to get the results you want.

Every yarn has different properties and requires different tension settings on the machine. Even between two yarns of the same fiber with the same yarn count, the tension settings can be very different.

Woolen yarns have a natural stretch and move easily through the machine without breaking. However cotton and linen for example have no stretch at all. These yarns need a bit more attention and caution when used. Patterns that require racking may be more difficult to achieve, especially with linen.

Fluffy yarns such as mohair can easily catch other yarns that are close and get tangled with them. To prevent this from happening you can place the cone in a loose plastic bag, containing the swing radius of the yarn when unwinding. When using multiple fluffy yarns, it is advised to thread them in pathways that are not adjacent but further apart.

Viscose and other silky yarns can be quite slippery. They are often sold with a thin, tight nylon tube around them to prevent the yarn from slipping down. Once it's off the cone there is no way to get it back on. Leave the tube on the cone then knitting, which also helps to unwind the yarn slower.

It is advised to not use fancy yarns like flame or sequin yarn, as the irregularities like lumps could get stuck in the needles or yarn feeders.

Remember: Finer yarns need more resistance than thicker yarn (see 6.4.1).

### *7.2 Yarn counts*

There are many yarn count systems in the world, so here are a few that are used for coned yarn with industrial standards.

The yarn count 'Nm' is used the most for industrial yarn in Europe and Asia. This metric numbering system (Nm) indicates 'number of 1000m (or 1 km) of yarn per 1kg weight', i.e. Nm30 means that 30.000 of yarn weigh 1 kilogram. Nm60/2 would be the same weight of yarn, but consists of two ends of Nm60.

Tex indicates 'how many grams of yarn per 1000m', i.e. 30Tex means that 30 grams of yarn are 1000m long. Decitex (dTex) indicates how many grams of yarn per 10000m.

Denier (DEN) is often used for nylon stockings and tights. It indicates 'how many grams of yarn per 9000m', i.e. 30D means that 30 grams of yarn are 9000m long.

For Nm, dtex and DEN applies: 'The higher the number, the finer the yarn'.

As the machine works best with industrial spun yarn on cones, you can compare this industrial used yarn count to a light fingering or 2 ply hand knitting yarn (needle size around 2mm).

Note: Hand knitting yarns are almost always not suited for Kniterate.

### *7.3 Yarn counts suitable for Kniterate*

Any yarn used on Kniterate is recommended to be at least double spun, which means the yarn consists of two separately spun yarns that are spun together. This technique makes the yarn much stronger than single spun yarn.

Kniterate works with the 'Nm' yarn count. Yarns suitable for Kniterate range from Nm6 to Nm 8, which includes Nm12/2, Nm14/2, Nm15/2, Nm28/4 etc. These are ideal for a 7gg look and feel of the fabric. Much thicker yarn would be problematic as it can cause broken needles. Thinner yarn can break more easily and creates a looser fabric.

It is possible to ply yarn when the yarn count is too low. You can knit two ends of Nm28/2 and thread them in one pathway (see 6.3.1). When plating you are also knitting with two ends of yarn, which should together be between Nm6 and Nm8.

### *7.4 Cones*

The yarn should be wound on a cone shaped cardboard or plastic bobbin (Fig 30a). The cone shape helps to unwind the yarn evenly while knitting. Cylindrical plastic bobbins (Fig 30b) are mostly used for dyeing yarn and can cause issues during the unwinding when used on the knitting machine (i.e. the yarn swings in a larger radius or gets caught at the bottom more often).

It is important that the yarn is wound evenly on the cone (Fig 30a), especially if you use your own winder. This makes sure the yarn unwinds correctly while knitting because irregularities could cause problems like yarn breaking.

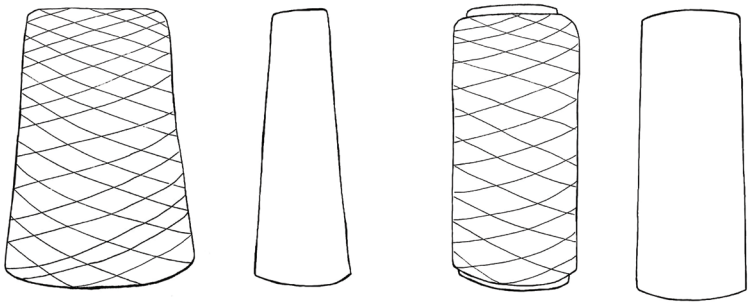


Fig 30 a a b b

# 8 KNITTING

## *8.1 Warming up*

When your machine has not been used for some hours, it is recommended to run the warm up program. This program runs the machine at a lower speed (under 300mm/s) and does not require any yarn to be threaded. Running the warm up will get components warm to perform better and last longer.

## *8.2 Machine limitations*

Knitting with a maximum of 6 yarns in a piece.
Knitting with a maximum of 6 yarns in a row.
Floats a maximum length of 6-7 stitches in fair isle knitting.
Short-rowing a maximum of 2-3 rows in the center of the piece.
Not possible to knit and tuck on the same needle bed in one pass.

Not being able to knit and tuck on the same needle bed on the same pass, means you can't trap the yarn to avoid long floats. It's ideal to make a great variety of stitches rather than color patterns when knitting on a single bed. Cardigan stitches are possible though.

Not being able to short row more than 2-3 rows in the center of a piece means it is not possible to knit seamless socks. Short-rowing on the edges is possible.

### *8.3 Using the menu dial*

The menu dial allows you to directly operate the machine and adjust certain functions when needed. Turn the dial to scroll through the menu and click the button to select a function.

| | |
|---|---|
| HOME | The carriage moves to its home position on the far left. |
| KNIT | Probably the most used function in the menu: starting your knitting! |
| PAUSE | Pause will halt your progress when knitting, but does not delete it. Select the function again to continue knitting. |
| SPEED ADJUST | Adjust the different speed parameters that are selected in the program, directly on the machine. Changing the speed on the machine overwrites all speed settings for the whole file. |
| ROLL +1 | When the machine is in standby mode (switched on but not in use) you can use this function to activate the rollers and roll the fabric down by 1mm. The rollers will move towards each other, pushing the fabric downwards. |
| ROLL -1 | When the machine is in standby mode (switched on but not in use) you can use this function to activate the rollers and roll the fabric up by 1 mm. The rollers will move away from each other, pulling the fabric upwards. This function is used to release the tension of the stitches being held on the needles. |

## *8.4 Knitting step-by-step*

### *8.4.1 Transfering a design to an SD card*

After making a design in the Kniterate software, download the '.kc' file to your preferred folder and rename it 'command.kc'. Transfer your file to an SD card. To do this, insert the SD card into the SD card slot of your computer or an SD card adapter that is attached to your computer. Copy your file from its folder to the SD card and eject the card when the file is transferred.

Place the SD card in the SD slot on the right hand side of the LCD menu before turning on the machine. The machine is now ready to read the file. Leave the card in the machine until your knit is completely finished.

If the SD card is not inserted or broken, the screen will let you know briefly before the menu loads that it can't open the SD card.

Remember: Only the file named exactly "command.kc" will be read.

### *8.4.2 Starting a knit*

Select 'Knit' by turning the wheel and pressing it to start the file. The carriage will move to its home position (on the far left side) first and then start knitting.

The carriage can't pick up the feeders when they are placed too far to the left. Before starting your program, move all feeders that your program will use to the area between the clamp and the needle bed. It is recommended to leave the unused feeders all the way to the left or right, so they are not in the way of the feeders that are working.

WARNING: Never place a feeder over the needle bed. This can cause a collision between the needles and the feeder, potentially damaging both.

### *8.4.3 Pausing a program*

Scroll to and press 'Pause' on the menu to pause the machine. Using the 'Pause' option does not affect your knitting progress, and when you unpause the machine will continue where it stopped. Resume by clicking the dial again without scrolling.

Remember: Using the power switch or the emergency stop button erases your knitting progress. You will need to drop the remaining knitted fabric on the needles and start over from the beginning.

### *8.4.4 Dropping an unfinished knit*

Sometimes you want to drop off a knit before it is finished and start over, due to a mistake for example. Pause the machine (7.1.3) and slide all feeders to either end of the carrier rails so the carriage can't pick them up anymore. Continue the program. Knitting withouth any yarn carriers will cause the knit to drop. Continue knitting until the rollers clear the knitting.

### *8.4.5 Taking off a finished knit*

The carriage will stop on the side when the knit is done and a message on the screen will indicate the program is finished. The item will come out automatically after the bind-off, but the last stitch needs to be carefully picked up and secured by hand. If you do this before dropping it completely, you have the smallest chance on dropping stitches.

## *8.5 Keeping an eye*

When the machine is knitting, you have to pay attention to a couple of things. It is strongly recommended to stay with the machine and keep an eye on the performance of the machine and the yarns when you're trying a new program, new yarns or just starting up for the first time in a while. Never assume it will give perfect results the first time you knit, it takes some tweaking and trying to get it right.

Make sure the machine picks up the right feeders
Make sure the yarns are unwinding smoothly
Make sure the yarn aren't tangling
Make sure the knit is coming out, i.e. not getting caught on the rollers
Closely watch the stitch size; too small could break the yarn or the needles, too loose could cause dropping stitches
Keep an eye on your yarns, don't let them run out while knitting an item

If the machine makes a grinding sound, stop the machine immediately and check for debris on the needle bed, the carriage rails and the carrier rails.

### *8.6 Sensors and errors*

There are eight different sensor errors that can be displayed on the menu:

| **Error** | **Location** |
|---|---|
| FRONT DOOR | Front doors both left and right |
| REAR DOOR | Rear doors both left and right |
| SIDE DOOR | Side panels on machine both left and right |
| SHOCK | Needle bed |
| CLUMP | Next to brushes on carriage |
| KNOT | Knot sensor on top yarn control unit |
| YARN TOP | Tension arm on top yarn control unit |
| YARN SIDE | Tension arm on lateral yarn control unit |

Some of the sensors have a red light to indicate which sensor is triggered. When more than one sensors are triggered, the menu will display 'ERROR: CLEAR ALL'. It is recommended to check all sensors when this happens.

When a sensor is activated the **carriage stops immediately** and the machine pauses. If you need to open any of the doors, wait until the carriage has fully stopped to do so. See chapter 6 for information on preparing the machine for knitting an item, or chapter 11 for troubleshooting.

After solving the issue clear the error by clicking the menu dial. The machine can resume the program from where it ended.

### *8.6.1 Tension arm on top yarn control unit*

The top tension arm sensor and the knot sensor are the easiest to detect as they use a bright red light on the front of the yarn control unit to indicate an error.

When the tension in the yarn drops too much, the arm jumps up, the sensor is triggered and the sensor light lights up. It normally refers to a broken yarn, having run out of yarn or incorrect machine settings for the used yarn.

Rethread the broken yarn and connect the broken ends in a small knot.

If there was no broken yarn but the tension arm went all the way up anyway, use the tension adjusting wheel to lower its resistance, or increase the pressure between the brake discs by turning the brake discs adjusting wheel clockwise. It is a balancing act to find the right tension and can take several tries.

When the tension arm is not rising at all during the knitting process, increase the pull in the tension arm by turning the tension adjusting wheel counterclockwise, or release some pressure from the brake discs by turning the brake discs adjusting wheel counterclockwise.

### *8.6.2 Knot sensor on top yarn control unit*

Each yarn control unit has a sensor to detect knots in the yarn. If the yarn running through the sensor has a knot, the knot will trigger the sensor by pushing the latch forward. This will be indicated by the same red light as an error with the top tension arm sensor.

Push the knot sensor latch back to clear the error and check the knot in the yarn. If it is a small knot that is tied up tightly, you can knit it with a lower speed for 2 to 3 rows to prevent the yarn from breaking. If the knot is bigger or tied loosely, cut the yarn and make a new, small and tight, knot before knitting it in slowly.

Remember: Always make sure to adjust the sensitivity of the knot sensor according to the yarn you are using so it can detect knots properly!

### *8.6.3 Tension arm on lateral contol unit*

The lateral tension arm sensor is similar to the top tension arm sensor. The light of this sensor is on the backside of the lateral yarn control unit.

When the tension on the yarn drops too much, the sensor is triggered and the sensor light lights up. It normally refers to a broken yarn or incorrect machine settings for the used yarn.

Rethread the broken yarn and connect the broken ends in a small knot. Knit 2 or 3 rows to knit the knot in without the yarn breaking.
If there was no broken yarn but the tension arm went all the way out anyway, use the sliders underneath the arms to change the resistance.

WARNING: Use safety goggles when manipulating the lateral tension arms.

### *8.6.4 Front and back doors & side panels*

The doors in the front and in the back, as well as the side panels, need to be completely closed to run the machine. Check and close all four doors and the two side panels.

### *8.6.5 Clump sensor*

The clump sensor is attached to the carriage and looks like a small metal arrow pointing straight down towards the needles. It is triggered by an uneven knitting area on the needles. There is one sensor for each knitting direction so that the error can be found early on. There is no light to indicate the error, but the carriage will stop and the menu will display 'CLUMP'.

The sensor slightly tilts when it detects a clump in the knitting. If it stays in this tilted position, you can move it back to its initial position and clear the clump in the knitting area. Clumps mostly occur when a needle is bent, stuck, or broken, and it can't create stitches anymore.

### *8.6.6 Shock sensor*

The shock sensor is hidden underneath the needle beds. It detects sudden vibrations, for example if the carriage hits a needle butt. There is no light that would indicate the error, but the carriage will stop and the menu will display 'CLUMP'.

Remove any broken needle parts and debris from the needle bed or replace needles or jack if there's any with broken butts. In case the sensor is triggered too easily or not enough, go to the menu to adjust the sensor's sensitivity.

### *8.6.7 Rollers*

The rollers and their sensor are underneath the needle bed and help the fabric to come out. An error will be detected if there is an abnormality on the rollers or within the fabric, or if any objects come in the roller area.

The sensor light is located right under the home position of the feeders, next to the yarn clamp. The green light indicates the sensor is working and the red lights indicate an error with the corresponding needle beds, i.e. the rear red light indicates for the rear needle bed and the front red light for front needle bed.

Mostly, an error occurs when the fabric comes out less straight, or the yarn from the start gets caught and pulls up the knit. Pause the machine and straighten the fabric, or if needed, turn off the machine and pull/cut the yarn(s) that pull the fabric up until the rollers are clean.

WARNING: Under no circumstances put your hand near or in the rollers area when the machine is on.

WARNING: Do not use the machine if the green light does not light up when the machine is on.

# 9 FINISHING A PRODUCT

There is a lot of information online on how to finish knitted items. You can find a short summary of some basic methods here.

## *9.1 Cutting and hiding yarn ends*

Never cut yarn ends too close to the knit, as it may unravel if you do so. Cut the ends at about 3 centimeters / 1 inch.

You can use a spare needle from your machine to hide yarn ends.

With an open latch, run the needle through a couple of stitches up to the yarn end. Catch the end, close the latch and pull the end through the stitches. Make sure the whole end is tucked inside and you shouldn't be able to spot it anymore.

## *9.2 Steaming*

You can steam your knit to relax the yarn. Use an iron that has a steam function. Hover the iron over the knit and release steam. Try not to press on your knit as that will flatten the stitches.

### *9.3 Assembling techniques*

Some items will require assembling, as a sweater for example. There are different techniques to do this, depending on what you are making and the equipment you have available.

| | |
|---|---|
| By hand | Requires some skill and it can be time consuming, but the results can be very good. The skills are easy to learn online or from books, and it can be done wherever you want. In this method the sewing yarn can be any (knitting) yarn of your choice. |
| Serger Overlocker | A serger is is a type of sewing machine that cuts surplus fabric to create clean stitch. It requires less skill and it is a quick assembly method, but since this machine is not made for connecting knitted panels, the results are not as good as hand sewing or linking. Taking out the stitching takes time and will leave your knit to unravel. You can use a serger for cut & sew garments, not for fully fashioned items. This method requires 3 to 5 polyester sewing threads. |
| Linking machine | This is a special machine for connecting knitted panels with clean stitches. It requires intermediate skill and is a common technique in the industry since it produces great results. The linking machine creates a chain stitch which is very secure, but also easy to unravel if needed, without unraveling the knit. You can use this method for fully fashioned knits. This method requires one knitting yarn which you can choose yourself. |

# 10 MAINTENANCE

## *10.1 Cleaning and oiling guidelines*

To prevent premature wear it is advised to keep your machine clean and well oiled. Dust, yarn fibers and general dirt in between the needles increase friction and makes the machine underperform. How often you have to clean and oil your machine depends on how much you use it and the types of yarn you use. Some yarns leave a lot of fibers behind, others barely any.

Cleaning and oiling recommendation for everyday use:

| | |
|---|---|
| Exterior | When necessary |
| Needle beds | Weekly |
| Carrier rails | Weekly |
| Carriage rails | Weekly |
| Carriage knitting cams | Every 6 months |

In the first weeks after setting up your machine, oil it more frequently.

Only lubricants as provided or recommended by Kniterate may be used. Other lubricants may damage the machine, e. g. due to insufficient lubricating action, rust on metal parts or damage to the electrical cable insulation and the plastic parts. Using the wrong lubricant can void the warranty.

## *10.2 Cleaning the exterior*

To prevent dust from falling into the machine, it is advised to keep the outside of your machine clean too. The easiest way to do this is with a damp cloth without soap.

### *10.3 Cleaning and oiling the interior*

Always switch the machine to the symbol "O" position to turn it off when cleaning the inside.

Always clean the machine before oiling to prevent dust from seeping between needles. There are different ways to clean the inside of your machine. You can use a vacuum cleaner or compressed air and a cloth or small brush. To apply oil, squeeze the included oil dispenser bottle lightly and move the brush head across the parts to be oiled.

#### *10.3.1 The needle bed*

When vacuuming, make sure to move around carefully and make sure you don't break any needles or latches. If you have a compressor you can also use compressed air. Dirty oil or dust that didn't come off can also be wiped with a dry cloth or small brush. Don't worry if you push down the jacks, the carriage will push them up again.

Never use any (cleaning) liquids on the inside of the machine.

#### *10.3.2 The carrier and carriage rails*

The yarn carrier rails should be kept clean and well oiled so that the yarn carriers can slide over them without any friction. With a dry cloth, remove the dust and dirt from the rails. Then oil them slightly, there should be no oil dripping. If you applied too much oil, use a cloth to remove the excess oil.

### *10.4 Emptying the oil reservoir*

The excess oil is collected in the oil reservoir. This reservoir should be emptied regularly, depending on how often you oil your machine. It is recommended to check the reservoir every week. Make sure to check the oil reservoir before cleaning and oiling your machine and empty it when necessary.

### *10.4.1 Reaching the oil reservoir*

The oil reservoir sits on the right hand side of the machine (see 6.1.1).
To empty the reservoir, simply grab the oil reservoir and carefully take it out. When placing the reservoir back, always make sure the tubes are placed so that the oil will drip into the reservoir.

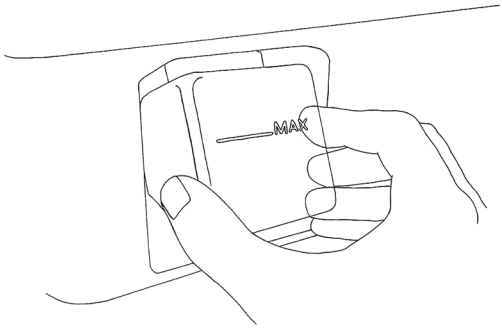



Fig 31

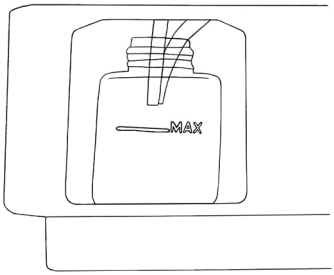



Fig 32

### *10.4.2 Disposing of oil*

Please dispose of the waste oil according to the guidelines of your local waste and recycling facilities.

Do not pour any oil down the drain or toilet.
Do not throw any oil out with regular waste.

## *10.5 Changing moving parts*

### *10.5.1 Changing needles*

When a needle is broken, it should be replaced with a new needle. Identify which needle needs replacement. Remove the horizontal bar using the bar removing tool.

Slide the needle up, and take it out.

Take the new needle and place the back of the butt in the empty groove on the needle bed. Slide the needle down into the groove until its butt is aligned with the other buts.

Slide the horizontal bar back using the bar removing tool.

### *10.5.2 Changing jacks*

When a jack is broken, it should be replaced with a new jack. Make sure that you replace the broken jack with an identical new jack, insuring that the pattern of the butts is maintained. Any changes to the pattern may cause the machine to select needles wrongly.

Slide the cover rail to the side using the tip of plyers and take out the jack you want to replace.

Place the bottom of the new jack, guide it into the groove and align with the jack butt pattern.

Slide the cover rail back.

## *10.6 The carriage*

It is recommended to take off the carriage every 6 months to clean and oil the knitting cams and the notches underneath.

### *10.6.1 Taking off the carriage*

Always perform this action with two people.
Always make sure the machine is turned off.
Always hold the carriage from the bridge.

Start by taking off the side panel on the side where you want to take the carriage off. See 5.4 on how to take the side panels off.

The carriage only has two connections to the machine, which need to be disconnected to take the carriage off. Once disconnected the carriage is not attached anywhere and can easily slide off and drop down. Make sure that the carriage is always held by someone.

Start with someone in front of the machine, and someone behind. From the front, hold the carriage still while the other person disconnects the cable of the electronics box and unscrews the three screws from the belt coupling. The carriage can now run freely to either side.

WARNING: Do not let go of the carriage when it is disconnected.

WARNING: The carriage weighs around 30 kg / 66 lbs, and its weight will be suddenly released as soon as it is off the rails.
Be ready to hold that sudden weight.

Pull the carriage to one end, while one person holds the carriage from the front and the other one from the back. Carefully take it off the rails straight, without tilting the carriage. Once the carriage is off, put it upside down onto a firm surface.

### *10.6.2 Placing the carriage back*

Insert the carriage back onto the rails. Do this very slowly and make sure the four bearings are surrounding the rails, both in the front and back.
While one person holds the carriage from the front, the carriage can be reconnected from the back. Place the side panel back (see 5.5).

# 11 TROUBLESHOOTING

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| Example problem | ■ **Example cause of problem**<br>• *Example possible solution for problem* |
| Machine is not turning on | ■ **The plugs are not connected properly.**<br>• *Secure plugs if necessary, in both the wall outlet as the plug connection on the back of the machine.*<br>■ **Emergency button is still activated.**<br>• *Turn clockwise to deactivate.* |
| SD card can't be read | ■ **There is no SD card inserted.**<br>• *Insert the SD card if you haven't yet.*<br>■ **The SD card is locked.**<br>• *Move the lock switch up to unlock the SD card.*<br>■ **The SD card is damaged.**<br>• *Check its performance in a different device.*<br>■ **There is no program loaded onto the SD card.**<br>• *Upload your program file.*<br>■ **The file does not have the correct name.**<br>• *Name the file **command.kc**.* |
| Yarn is breaking | ■ **The yarn is not threaded correctly**<br>• *Thread yarns correctly according to chapter 6.3.*<br>• *Release yarns that wrapped around any parts.*<br>■ **The yarn is tangled**<br>• *Untangle any tangled yarns.*<br>■ **Tension too high**<br>• *Lower tension with the tension adjustment wheel.*<br>■ **The stitch size too tight**<br>• Increase stitch size in the software.<br>■ **The yarn is running under the cone**<br>• Release yarn and ensure proper unwinding.<br>■ **A needle is broken**<br>• Replace the needle.<br>■ **The yarn is too weak**<br>• Ply the yarn or use a different yarn. |

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| Yarn is tangling | ■ **The cones are positioned too close to each other**<br>• *Use different paths to give cones more space.*<br>• *Place cones directly behind the machine to give cones more space*<br>■ **Using fluffy yarns (like mohair)**<br>• *Use paths that are further apart to create more space between fluffy yarns.*<br>• *Place the cone in a loose plastic bag to contain the swinging radius of the yarn, to prevent unwinding yarns from catching each other.*<br>■ **Yarn paths crossing**<br>• *Thread yarns correctly according to chapter 6.3.*<br>• *Release yarns that wrapped around any parts*<br>■ **The yarn swings out too much when unwinding**<br>• *Use nylon tights and cut them in tubes to pull over the cone*<br>• P*ut the cone into a plastic bag to avoid that the unwinding yarn tangles the surrounding yarn* |
| Machine is dropping stitches | ■ **A needle is broken**<br>• *Replace the needle.*<br>■ **A jack is broken**<br>• *Replace the jack.*<br>■ **Wrong stitch size**<br>• Change the stitch size in the software.<br>■ **Wrong tension (for dropped stitches on the edge)**<br>• *Increase the resistance on the lateral tension arm.*<br>■ **Failed transfer**<br>• *Check the transfer spring on the needle that dropped the stitch and replace it if necessary.*<br>• *Check if all the needles are straight and parallel to each other* |
| Holes | ■ **Breaking yarn**<br>■ **Failed transfer**<br>• *Check the transfer spring on the needle that dropped the stitch and replace it if necessary.* |
| Needle is not knitting | ■ **Broken needle** |

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| | ■ **Broken needle butt**<br>■ **Broken jack**<br>• *Needle latch is stuck underneath the hook*<br>*Take the needle out. Use pliers and carefully try to release the latch without breaking or bending it. Place the needle back.*<br>■ **Needle latch is stuck underneath the hook**<br>• *Use pliers and carefully try to release the latch without breaking or bending it.* |
| Yarn is piling up on the needle bed | ■ **Needle latch is stuck underneath the hook**<br>• *Use pliers and carefully try to release the latch without breaking or bending it.* |
| Knit rolling up in rollers | ■ **The knit got caught on the rollers**<br>• *Drop any remaining stitches on the needle bed. Try to pull the piece out of the rollers and/or cut little by little with scissors. Don't use the rollers till you freed all the knit!*<br>■ **A yarn from the beginning of the knit got caught**<br>• *Stop the machine and try to pull the yarn out of the rollers.*<br>■ **The fabric is not coming out fully straight.**<br>• *Gently straighten the fabric.* |
| Carriage isn't moving | ■ **The machine is paused**<br>• *Unpause the machine using the menu dial*<br>■ **Needles or debris got stuck underneath the carriage**<br>• *Turn the machine and on. Wait 20 seconds, the operation mode and internal cams will change. Then turn it off again, and push the carriage to the side manually. Needles can potentially break during the moving of the carriage. Clear out any needle parts or debris and change the broken needle(s).* |

**Get in touch!**

If there are any problems you can't solve using this manual or our online information, please reach out and we'll be there to help!
*Email: info@kniterate.com*

For any questions or suggestions, please contact us.
*Email: info@kniterate.com*
*Instagram: @kniterate*